VISUAL FIELD INTERPRETATION IN GLAUCOMA

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Visual Field Interpretation
- Methods of Data Presentation
- Systematic Strategy for Interpreting Visual Field / Recognizing Visual Field Loss
- Diagnostic Criteria for Glaucoma
- Classification of Visual Field Loss

RELIABILITY
- CATCH TRIALS
  - FIXATION LOSSES (20%)
  - FALSE POSITIVES (20%)***
  - FALSE NEGATIVES (33%)
- GAZE TRACKER

METHODS OF DATA PRESENTATION
- GRAYSCALE
  - GIVES A PICTURE RESEMBLING ISOPTERS IN A GRAY TONE
  - QUICKLY IDENTIFIES OVERALL DEPRESSIONS

METHODS OF DATA PRESENTATION
- NUMERIC GRID
  - RAW DATA (THRESHOLD LEVELS)

METHODS OF DATA PRESENTATION
- TOTAL DEVIATION PLOT
  - DIFFERENCE BETWEEN PATIENT'S RESPONSES AND AGE-MATCHED NORMAL POPULATION
- TOTAL DEVIATION PROBABILITY PLOT
  - SIGNIFICANCE OF THE TOTAL DEVIATION PLOT
METHODS OF DATA PRESENTATION

• PATTERN DEVIATION
  – Adjusts the total deviation for the overall height of the hill of vision
  – Can be adjusted up or down
• PROBABILITY PLOT

- GLOBAL INDICES
  - Single number representations of the visual field
  - Overall guidelines to help assess field
  - Probability values given when numbers reach significant values

Figure 1. The normal hill of vision. Visual sensitivity is greatest in the areas where the hill of vision peaks.
GLOBAL INDICES

• MEAN DEVIATION (MD)
  – HEIGHT OF THE HILL OF VISION COMPARED TO AGE-MATCHED NORMALS
• PATTERN STANDARD DEVIATION (PSD)
  – DEGREE TO WHICH THE SHAPE OF THE VISUAL FIELD DIFFERS FROM REFERENCE FIELD
  – DOES NOT CHANGE WITH MEDIA

Glaucoma Hemifield Test

• Mirror Image Analysis Compares Superior to Inferior Field
  – Within Normal Limits
  – Borderline
  – Outside Normal Limits
  – Abnormally High Sensitivity
  – General Reduction In Sensitivity

What’s the VFI???

INTERPRETATION OF THE AUTOMATED VISUAL FIELD

• RELIABILITY
  – MUST KNOW WHETHER OR NOT THE DATA YOU ARE ANALYZING IS RELIABLE
  - FIXATION LOSSES (20%)
  - FALSE POSITIVES (20%)
  - FALSE NEGATIVES (33%)

RECOGNIZING VISUAL FIELD DEFECTS

• GRAYSCALE: NOT APPROPRIATE FOR MAKING DIAGNOSIS
• MUST CONCENTRATE PRIMARILY ON THE DEVIATION PLOTS AND GLOBAL INDICES, SOME ATTENTION TO RAW (THRESHOLD) DATA
RECOGNIZING VISUAL FIELD DEFECTS

• USING THE TOTAL OR PATTERN DEVIATION PLOTS:
  – FIND MOST DEPRESSED POINTS;
  – EXAMINE POINTS SURROUNDING THOSE
  – LOOK FOR PATTERNS CONSISTENT WITH GLAUCOMA
    • NASAL STEP
    • ARCUATE BUNDLE
    • PARACENTRAL

RECOGNIZING VISUAL FIELD DEFECTS

• Look at Global Indices & GHT
  – For diagnosis, look to see if they reach statistical significance
  – For following over time, look for change

RECOGNIZING VISUAL FIELD DEFECTS

ALWAYS:
1. LOOK AT BOTH FIELDS TOGETHER
2. LOOK AT FIELD WITH RELATION TO OTHER CLINICAL FINDINGS - DOES THIS MAKE SENSE, IS IT CONSISTENT WITH THE DIAGNOSIS OF GLAUCOMA?
3. DON’T OVERLOOK OTHER CAUSES OF VISUAL FIELD DEFECTS

Look At Both Fields Together
Look At Both Fields Together

Look at field with relation to other clinical findings

Look at field with relation to other clinical findings

Predict the Visual Field...

Predict the Visual Field...
KEY POINTS TO INTERPRETATION

- Make sure you are looking at trustworthy data
- Will probably take 3-4 tests to achieve appropriate baseline
- Make sure it makes sense with other clinical findings

STRATEGY DECISIONS

- 30-2 vs. 24-2
- Size III vs. Size V
- 24-2 vs. 10-2
- SITA-Standard vs. SITA-Fast (vs. Threshold or FastPac)

30-2 versus 24-2

24-2 versus 10-2

Minimum Criteria for Diagnosis of Glaucoma VF Defect (HODAPP, ET AL, 1993)

1. GHT outside normal limits on at least two occasions —or—
Minimum Criteria for Diagnosis of Glaucoma VF Defect (HODAPP, ET AL, 1993)

2. CLUSTER OF 3 OR MORE NON-EDGE POINTS (in a typical location for glaucoma), ALL OF WHICH ARE IDENTIFIED AS SIGNIFICANT, WITH AT LEAST ONE AT THE p<1% ON TWO CONSECUTIVE TESTS
   - (ON 24-2, USE ALL POINTS)
   -OR-

3. PSD FLAGGED AT p<5% OR WORSE ON TWO CONSECUTIVE FIELDS
CLASSIFICATION OF FIELD LOSS (Modified from Hodapp, et al)

- MILD (all 3 criteria must be met):
  - FOR 24-2 SITA STANDARD
    - MD DEPRESSED BY <-5dB AND
    - ON PD PLOT, <25% (14) POINTS ARE DEPRESSED BELOW THE 5% SIGNIFICANCE LEVEL and fewer than half of those points are depressed below the 1% LEVEL AND
    - NONE OF CENTRAL FOUR POINTS HAS SENSITIVITY OF <20dB

CLASSIFICATION OF VISUAL FIELD LOSS

- MODERATE (24-2 Sita)
  - MD -5dB TO -10dB OR
  - ON PD PLOT, <50% (14-28) POINTS ARE DEPRESSED BELOW 5% LEVEL, OR 8-16 POINTS ARE BELOW THE 1% LEVEL OR
  - CENTRAL POINTS BETWEEN 10-20dB IN ONE HEMIFIELD (NO POINTS IN CENTRAL 5 DEGREES WITH <10dB)
CLASSIFICATION OF VISUAL FIELD LOSS

- SEVERE (24-2 Sita)
  - MD DEPRESSED BY MORE THAN -10dB OR
  - ON PD PLOT, GREATER THAN 50% (28) POINTS ARE DEPRESSED BELOW 5% OR MORE THAN 16 POINTS ARE BELOW THE 1% LEVEL OR
  - BOTH HEMIFIELDS IN THE CENTRAL 5 DEGREES HAVE <20dB OR
  - ANY POINT IN THE CENTRAL 5 DEGREES HAS A VALUE <10dB

INTERPRETATION TEMPLATE

- LOOK AT RELIABILITY
- LOOK AT CENTRAL LEVELS
- FOR VARIATIONS OF >4dB ACROSS HORIZONTAL MIDLINE NASALLY
- TOTAL / PATTERN DEVIATION PLOT - MOST DEPRESSED POINT AND SURROUNDING POINTS
- GLOBAL INDICES (MD, PSD, GHT, VFI)

FOR THE RECORD

- ICD-9 (ICD-10)
- Specific test performed (24-2 SS)
- Statement with respect to reliability
- Statement with respect to location, size, density, and pattern of the defect
- Statement that correlates other examination findings with this visual field
- Statement about stability/progression (or words “BASELINE”)
- (Statement about how these results influence your management) ???
• Interpretation:
  – 365.11 (POAG)
  – 24-2 SS
  – Reliable
  – Severe loss: Large, dense inferior arcuate defect, c/w superior notch and inferior thinning of ONH
  – Baseline test
  – Aggressive therapy indicated

• Interpretation:
  – 365.11
  – 24-2 SS
  – Reliable
  – Mild loss: Small, shallow inferior nasal step/partial arcuate c/w superior>inferior thinning of ONH
  – Baseline test
  – Initiate therapy

Interpretation
• 365.11
• 24-2 SS with GPA
• Severe loss: Large, dense superior arcuate defect c/w inferior notch of ONH
• GPA shows no progression on trend/event analysis
• Continue current therapy

Thank you for your attention!

Questions?

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